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Cotton in Brazil

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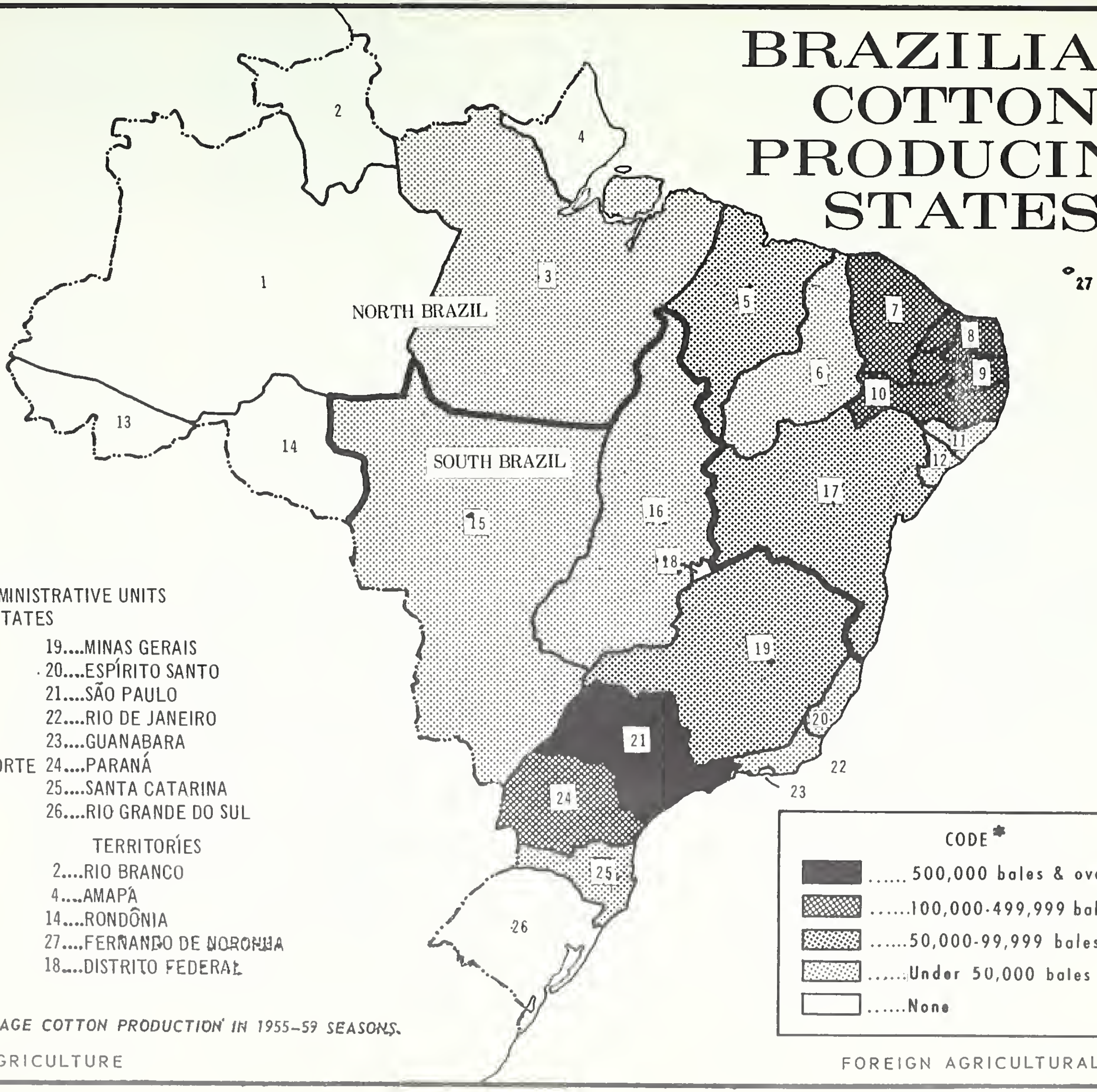
U. S. DEPARTMENT OF AGRICULTURE

BRAZILIAN COTTON PRODUCING STATES



INDEX TO ADMINISTRATIVE UNITS
STATES

1....AMAZONAS
3....PARÁ
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7....CEARÁ
8....RIO GRANDE DO NORTE
9....PARAÍBA
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20....ESPÍRITO SANTO
21....SÃO PAULO
22....RIO DE JANEIRO
23....GUANABARA
24....PARANÁ
25....SANTA CATARINA
26....RIO GRANDE DO SUL

TERRITORÍES
2....RIO BRANCO
4....AMAPÁ
14....RONDÔNIA
27....FERNANDO DE NORONHA
18....DISTRITO FEDERAL

CODE*

■ ......500,000 bales & over
▩ ......100,000-499,999 bales
▨ ......50,000-99,999 bales
░ ......Under 50,000 bales
☐ ......None

*DATA BASED ON AVERAGE COTTON PRODUCTION IN 1955-59 SEASONS.

U.S. DEPARTMENT OF AGRICULTURE

FOREIGN AGRICULTURAL SERVICE

ACKNOWLEDGMENT

Appreciation is expressed to the large number of persons in Brazil who gave generously of their time and drew upon their knowledge of the industry to provide information on cotton and its role in the economy of the different parts of Brazil. Generous assistance was provided by public officials, staff members of research organizations, cotton producers, and by commercial and banking leaders. Appreciation is also expressed for the assistance provided by United States personnel stationed in Brazil, and to those Brazilians and Americans, in government service and in private business, who reviewed the manuscript and made helpful suggestions concerning it.

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COTTON IN BRAZIL

By Horace G. Porter
and
Jimmy D. Minyard
~~Cotton Division~~

SUMMARY AND CONCLUSIONS

Cotton has a long and significant history in Brazil. For many years cotton was important only in the Northeast, but during the decade of the 1930's, cotton attained an important place in South Brazil, and since that time production in the southern zone has substantially exceeded production in the Northeast.

Brazil has vast land resources that could be devoted to the production of cotton or other crops. In the Northeast, cotton yields are far lower than in the south, but northern cotton has fewer competitors for a significant place in the farming system and therefore tends to have strong holding power as the major cash crop on many farms.

In South Brazil, yields are much higher, but cotton faces keen competition from other crops. Here it performs a supporting role in coffee production. Coffee planters frequently pay for the clearing of jungle land for coffee by allowing the laborer the cotton he produces on the newly cleared land for 3 years before it is planted to coffee. Cotton is frequently interplanted with coffee, especially when frost damage makes it evident that coffee production will be reduced. It also is often grown for a few years on land after the old coffee trees are uprooted. Afterwards, former coffee land on large holdings may be converted into grassland for cattle, continued in annual crops, or, if too badly eroded, it may be abandoned as far as productive use is concerned.

The strains placed on the Brazilian economy by the foreign exchange situation have had their effect on cotton production. This is the result of the variable exchange rates that Brazil has employed. The variation in rates applicable to different commodities has altered their relative profitability. Sometimes the applicable exchange rates have helped, and at other times they have hindered the profitability of cotton production.

Inflation and the general weakening of the foreign exchange rate have raised serious problems in cotton production in the movement of the crop, and in the Brazilian cotton textile industry. Despite the obstacles that these factors have at times constituted, the expansion of cotton production in recent years suggests that on net balance they have worked to improve rather than retard cotton's competitive position.

Brazil's cotton textile industry has been in existence more than a century. It has grown to the extent that it now supplies essentially all textiles consumed in the country and a small volume for export. Much of Brazil's textile machinery is old and there is need for improvements in plant and equipment and in management and operations if the industry is to become modern and efficient. The development of the Latin American Free Trade Association puts Brazil, a member, under considerable pressure to move ahead rapidly with such a modernization program in order to take advantage of opportunities to grow as trade barriers between the members are reduced.

For years it has been the policy of Brazil to insure adequate supplies of raw cotton for its cotton textile industry, and exports are authorized only if they conform with that policy. There has been a decided upward trend in mill consumption of cotton in Brazil. However, the amount of cotton going into export has fluctuated widely. Periods of decidedly upward or downward trends in cotton production, as well as wide year-to-year variation in production have resulted in a sharply expanding or contracting supply of cotton available for export.

Such changes have decided effects on both the foreign exchange earnings of Brazil and the reliance that cotton importing countries can place in Brazil as a source of raw cotton.

Only the unfolding of developments on many facets of the Brazilian economy will provide an adequate basis for judging what the future holds for cotton. The Brazilian financial situation will have an important effect on the future of the cotton economy. The general rate of economic growth will also exert an influence, as will the extent to which various sectors of the economy share in the economic progress. The speed with which agriculture becomes less exploitive of soil resources and farmers adopt improved cultural practices will also play important roles in cotton's future.

Progress is being made on most or all of the above lines of interest, but it is unlikely that it will be so rapid in individual areas, or in the aggregate, as to cause any major spurt in cotton production over the next 5 or 10 years. In fact, progress in some lines, such as raising levels of living or improving cultural and soil management practices, could help other types of farm production fully as much as they might help cotton production, and maybe more. If so, what might represent progress for Brazilian agriculture in general, might not represent progress for Brazilian cotton in particular. The chances are, however, that expansion will continue in production, mill consumption, and exports of cotton. At present, the magnitude of change appears likely to be of modest proportions.

HISTORY

That cotton is indigenous to Brazil is fairly conclusively established by reports of the first Europeans reaching the area around 1500. Early travelers and settlers almost invariably, and in many cases with a degree of awe, describe some phase of the cotton industry which, even then, was scattered throughout much of the country. The first cotton produced by the Portuguese settlers is recorded in 1549 and exports probably began around that time.

The first recorded evidence of sizable exports is contained in a description of the cargo of a shipwreck off the coast of Brazil in 1565, almost 50 years before the first permanent settlement in the United States.

Production of cotton, all perennial or tree-type, expanded slowly, and cotton soon came to be used as money in several Northern States. In Maranhão, cotton exports were prohibited from 1703 to 1756 because cotton was considered money, and officials feared that if exports were permitted, the money supply would soon be exhausted. By 1775 cotton was an important item in Brazilian exports. About this same time, the first sizable textile plants, outside a thriving but crude home industry, were established. Around 1800, following the invention of the cotton gin and subsequent rapid expansion of cotton production in the United States, Brazilian production and exports leveled off, and the cotton industry remained fairly static until the U. S. Civil War.

When, in 1861, it became evident that cotton supplies from the United States would be curtailed because of internal strife, the thriving textile industry in Europe began to encourage South American farmers to produce more cotton. The British, especially, encouraged Brazilians to sharply expand their output, and shipped some seed from the United States to São Paulo for distribution. Although annual cotton had been introduced into Brazil some 20 years earlier in Minas Gerais, this was the first attempt to produce such cotton on a large scale in Brazil.

The São Paulo Government showed lively interest in the possibility of developing commercial cotton production. A large fazenda owner was guaranteed a profit for multiplying the annual-type seed distributed by the British. The following year, 1862-63, 133 farmers each received free about 3 kilograms of seed for planting, and São Paulo cotton production was underway.

In 1862, São Paulo had a small volume--five bales--of cotton for export. By 1865, exports totaled 12,000 bales, and in 1871 reached a peak of 45,000 bales. After this peak, a sharp decline began, and in 1877 exports totaled only 3,000 bales.

Cotton production in other Brazilian producing areas, stimulated by high prices, climbed rapidly between 1861 and 1871. Total Brazilian exports rose from 41,000 bales in 1860-61 to 196,000 bales in 1865-66 and to a peak of 361,000 bales in 1871-72, then began to decline in much the same pattern of São Paulo. Domestic consumption may also have been growing during this period, but data are incomplete. Such data do reveal, however, that cloth production in Brazil climbed from a level of at least 1.3 million yards in 1853 to 3.9 million in 1866 and to 24.1 million in 1882.

PRODUCING AREAS

Brazil has two quite distinct areas of production--the Northeast and South Brazil. South Brazil accounts for an average of about two-thirds of the total cotton production, and the Northeast the remainder. One of their principal points of difference is in the time of the year they plant and harvest cotton. In South Brazil, cotton is planted in October and November and picked from

March to July. In the Northeast, planting is done from February through May and the crop is picked from August through November. There are many other differences between the two important producing zones as will be noted elsewhere in this report.

South Brazil's main cotton growing region is in São Paulo and northern Paraná States where 88 percent of the southern crop is grown. These States are the major agricultural producing area of the country. Although they have only 5 percent of the country's total land area, their output accounts for about 40 percent of the total value of Brazilian agricultural production. Together with Minas Gerais, they account for a large percentage of Brazil's total production of peanuts, coffee, rice, corn, potatoes, dry beans, sugarcane, cattle, and hogs.

Rainfall in practically all of the southern area is adequate for producing cotton. Distribution is not ideal, but the latter months of harvest tend to be generally favorable for gathering cotton. Except for a small coastal band, almost all of the tillable land in São Paulo State is suitable for cotton. Much of the northern half of Paraná and a sizable part of Minas Gerais also are suitable for cotton farming. Additionally, there are large areas of Goiás and Mato Grosso States where cotton could be cultivated.

With the passage of time, cotton has "moved west" in South Brazil. The trend is evident as one travels west from the eastern areas of production. One passes for miles through what were once important cotton areas before glimpsing many fields of cotton (although some former cotton areas are again taking up production on what promises to be a fairly stable basis). One leaves the rolling areas where cotton fields are completely cleared and free of stumps and moves successively through areas where stumps remain; where logs lie in the fields; where the remains of dead trees still stand; and finally, where the jungle is being sufficiently subdued to start the cultivation of cotton and coffee.

In the Northeast, an economic analysis of cotton requires that three areas and kinds of production be delineated. First, behind the coastal area, where rainfall is too heavy for cotton, lies the upper coastal cotton area. Rainfall in this area is customarily from 25 to 40 inches, and it is here that the annual or Upland-type "Mata" cotton is grown. To the west of this upper coastal cotton area, which ranges in width from 5 to 100 miles, lies the second region, an area of lower rainfall, where both annual-type "Mata" and perennial-type "Sertão" cotton are grown. Still further inland, where rainfall is normally inadequate for annual cotton, is the third region. "Serido" cotton is grown here.

The Sertão and Serido are not distinct varieties of cotton. Rather, they are commercially recognizable names for perennial cotton derived from the regions in which the cotton is grown. The perennial cottons are largely derived from Mocó, which is a local name for cotton properly classified as Gossypium hirsutum--Marie Gallante variety. This perennial-type cotton, sometimes called "tree cotton," is capable of withstanding drought better than any other known variety. Its roots have been known to go down as much as 16 feet in search of adequate moisture.

"Tree cotton" produces only a moderate crop, if any, the first year, but starting the second year it hits its stride in terms of yield. In older fields, plant populations tend to decline, helping to cause yields to taper downward. Typically, fields are allowed to grow for about 7 years, but some remain for 10 years. Because of its resistance to drought, this perennial cotton is widely regarded as one of the best and most dependable cash crops by farmers in regions of scant rainfall.

Cotton does not fit into an intensive cash crop economy in the Northeast as it does in the South. Northern perennial cotton areas are generally characterized as predominantly subsistence farming areas. Periodically, production in these areas falls even below subsistence levels and the outflow of people is much greater than normal. This happened in the drought year 1958. However, when rains come, the cotton will start to grow again, and returning families can expect their cotton to have survived and to provide them with a source of cash income after a few months.

TRENDS IN ACREAGE AND PRODUCTION

Acreage

Trends in Brazil's cotton acreage have been varied, both from one period to another and from one part of the country to another. On the whole, however, cotton acreage in Brazil has shown a distinct uptrend since the late 1920's. The greatest period of expansion occurred in the middle and late 1930's, but the trend in recent years has been rather sharply upward, and the area devoted to cotton now appears to have exceeded 8 million acres, with both South and North Brazil reporting recent increases in acreage.[1]

South Brazil in the late 1920's accounted for only about 15 percent of Brazil's cotton acreage. It now accounts for close to 40 percent, and currently both acreage and production, even with a good deal of fluctuation from State to State and from year to year, is up sharply.

It was in South Brazil that a vast expansion of cotton acreage and production took place in the 1930's, almost simultaneously with the cutback of cotton production in the United States in the same decade. Within South Brazil, the expansion was much more pronounced in São Paulo than the other States. The vastness of São Paulo's undeveloped land resources and the depressed state of coffee aided the boom.

Acreage in São Paulo State reached a peak in 1940-44. In this 5-year period, the State was averaging 4.1 million acres in cotton, 94 percent of the

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[1] In computing cotton acreage, official Brazilian statistics have been used. Although these data are not always completely reliable because of inconsistent reporting methods from State to State, it is felt that they provide the only effective means of observing acreage trends. Therefore, they are used in this report for the individual States and the two major regions. To adjust the data to an August-July year, the northern crop, harvested in the late months of one calendar year, is combined with the acreage of the southern crop harvested in the earlier months of the next calendar year, in order to derive the crop-year acreage figure for the entire nation. Even with this adjustment, these data are substantially higher than that used by the U.S. Department of Agriculture. In part, the lower U.S. figures for cotton acreage in Brazil reflect the conversion of Brazil's actual acreage to a solid-equivalent acreage assuming the normal spacing for Upland cotton.

South Brazil total. Its share has declined since this peak period and in 1955-59 accounted for 68 percent of the total cotton acreage in South Brazil. Along with the steadily declining acreage in São Paulo, there has been a definite shift in the growing area within the State. Acreage during the sharply expanding period of the 1930's was primarily in the central and northern regions of the State. Currently it is primarily in the extreme western and northern parts. The old cotton region in the central area now produces only a small share of the crop.

There are several reasons to explain the downward trend in cotton acreage in São Paulo as well as the shifts in the location of cotton production within the State. One is the exploitive nature of agriculture in Brazil that results in migration to new farmland when the old is depleted. This exploitation occurred in the central and northern regions of the State and now cotton acreage is concentrated in the newer areas in the extreme west and north.

The general downward trend in cotton acreage also reflects the fact that competitive crops are more easily marketed in the rapidly growing city of São Paulo. The city of São Paulo, located in the State with the same name, is the industrial center of Brazil. A city of some 4 million inhabitants, it offers an excellent market for various other agricultural commodities as well as cotton. The sharply rising demand for food in São Paulo over the years appears to have had an adverse effect on cotton production, since cotton prices, which are closely related to world price levels, have frequently not been as profitable to producers as perishable food products and staple food crops for which Brazil is on an import basis.

For many years Minas Gerais State, though far behind São Paulo, ranked second among the southern States in cotton acreage. With the dropback of Minas Gerais during the decade of the 1940's, Paraná first drew abreast with, and recently moved securely into, second place among Southern States.

At one time, Northern Brazil was traditionally Brazil's only or leading cotton growing area, depending upon the particular point in time under consideration. This situation continued until the tremendous expansion of São Paulo caused South Brazil to move out in front--a position it held for the three 5-year periods 1935-39 and 1945-49.

Although South Brazil moved out in front of North Brazil in the 1930's, this did not come about as a result of any cutback in the Northeast. In fact, cotton acreage in the northern zone has, with the single exception of the war years 1940-44, moved up in each succeeding 5-year period.

Cotton is produced in sizable quantities in quite a few of the States of Northern Brazil. Four of the States, Ceará, Paraíba, Pernambuco, and Rio Grande do Norte, each planted over 850,000 acres in the year 1961-62.

Maranhão and several other Northern States combined are about as important in the aggregate as any one of the four leaders. The rate of gain has perhaps been a little more rapid in Ceará than elsewhere in the Northeast, but the rate of growth of each of the States shows a marked similarity to the overall pattern of cotton acreage trends in the Northeast.

TABLE 1.--Cotton acreage and production in selected areas, of Brazil, averages 1925-59, and annual 1960-61

Crop year	North Brazil							South Brazil					
	Ceará	Maranhão	Paraíba	Pernambuco	Rio Grande do Norte	Other[1] N. Brazil	Total N. Brazil	São Paulo	Paraná	Minas Gerais	Other[2] S. Brazil	Total S. Brazil	Total all Brazil
	ACREAGE												
	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres
Average:													
1925-29........	218.5	115.3	282.8	217.1	202.7	253.3	1,289.7	123.1	1.5	56.5	21.1	202.2	1,491.9
1930-34........	275.4	198.0	331.6	289.7	213.5	406.2	1,714.4	662.9	20.3	144.8	24.2	852.2	2,566.6
1935-39........	469.4	90.6	540.0	407.1	307.8	491.5	2,306.4	2,904.9	45.7	323.8	38.7	3,313.1	5,619.5
1940-44........	388.5	79.5	420.9	375.4	310.7	254.8	1,829.8	4,051.2	95.9	100.8	50.4	4,298.3	6,128.1
1945-49........	687.3	133.4	531.6	423.2	669.3	265.9	2,710.7	2,975.2	126.3	115.9	60.5	3,277.9	5,988.6
1950-54........	784.3	164.4	655.9	555.0	748.7	364.3	3,272.6	2,597.4	215.2	219.5	123.8	3,155.9	6,428.5
1955-59........	947.4	244.1	826.4	706.1	832.9	515.4	4,072.3	1,722.2	359.9	318.6	109.1	2,509.8	6,582.1
Annual:													
1960..........	1,063.8	312.2	1,039.4	854.8	959.0	637.8	4,867.0	1,695.9	481.5	345.6	152.9	2,675.9	7,542.9
1961[3].........	1,228.1	386.0	1,082.9	869.4	997.7	725.3	5,289.4	1,936.2	530.0	380.5	168.4	3,015.1	8,304.5
	PRODUCTION												
	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales
Average:													
1925-29........	61.9	46.2	100.1	75.9	74.6	75.4	434.1	40.1	0.6	21.0	8.0	69.7	503.8
1930-34........	68.7	47.9	103.2	78.0	72.6	100.9	471.3	246.3	8.3	41.0	5.4	301.0	772.3
1935-39........	140.1	31.2	179.2	120.4	105.1	138.0	714.0	1,116.2	18.9	98.0	13.5	1,246.6	1,960.6
1940-44........	115.1	24.8	128.3	81.3	93.0	68.7	511.2	1,598.4	38.1	31.0	17.3	1,684.8	2,196.0
1945-49........	168.3	25.3	111.7	84.7	117.6	63.0	570.6	958.3	55.9	41.7	18.7	1,074.6	1,645.2
1950-54........	168.2	37.7	115.1	80.3	102.7	75.1	579.1	1,110.1	89.0	76.2	39.5	1,314.8	1,893.9
1955-59........	198.5	54.5	154.9	100.4	126.5	114.5	749.3	830.8	192.8	97.4	35.7	1,156.7	1,906.0
Annual:													
1960..........	265.5	71.0	255.2	153.0	181.6	162.8	1,089.1	1,049.8	380.5	123.7	64.8	1,618.8	2,707.9
1961[3].........	314.6	88.6	226.9	153.9	178.7	174.5	1,137.2	1,461.6	462.3	150.3	78.6	2,152.8	3,290.0

[1] Includes Alagoas, Amazonas, Bahia, Pará, Piauí, and Sergipe.
[2] Includes Espirito Santo, Goías, Mato Grosso, Rio de Janerio, Rio Grande do Sul, and Santa Catarina.
[3] Partially estimated.

Derived from figures from Annuario Statistico.

VARIETIES

Cotton varieties in South Brazil are all Upland-type evolving from several U.S. varieties. The respective State governments are responsible for breeding work. São Paulo State has been particularly active in this work and several new varieties have been released from its experiment stations in recent years. As a result, staple lengths in São Paulo have improved considerably in the relatively few years between 1954 and 1961.

TABLE 2.--Commercial staple of the cottons produced in the State of São Paulo

Type	1954	1955	1956	1957	1958	1959	1960	1961	1962
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
27 mm or less (15/16")	8	42	22	41	1	2	--	--	--
28 mm (1")	50	50	69	54	15	6	3	9	2
29 mm (1-1/32")	41	8	9	5	77	18	21	60	43
30 mm (1-1/16")	1	--	--	--	6	55	61	26	44
Above 30 mm (Above 1-1/16")	--	--	--	--	1	19	15	5	11
	100	100	100	100	100	100	100	100	100

Brazilian statement to the 22nd Plenary meeting, International Cotton Advisory Committee.

Although staple lengths have improved, there has been no corresponding progress concerning other quality attributes of cotton. In fact, considerable criticism is heard of the quality of São Paulo cotton.

The rapid improvement in staple length of São Paulo cotton reflects both the breeding work and control of seed distribution exercised by the State. As soon as a variety proves acceptable, the government supervises multiplication and distribution of the seed to farmers. Producers, purchasing seed at cost from the government, must accept the strains being distributed.

The system of strict control over cotton breeding and seed distribution possesses some advantages of administrative efficiency. At the same time, it carries certain responsibilities to develop varieties that on an overall basis are as high yielding and spinnable as the varieties produced in other countries if farm income and the reputation of the cotton in consuming areas are not to suffer.

Present breeding work is aimed at developing wilt resistant varieties with suitable yield and quality characteristics. The rapid spread of fusarium wilt, especially in the older producing areas of São Paulo, has sped up work on resistant varieties.

The State seed monopoly also has a campaign underway to treat all distributed seed to control pink bollworm, which in some years has done a great deal of damage. About one-fourth of the seed distributed in 1961-62 was treated.

There is a fairly wide range in grade of Brazilian cotton from year to year, mainly because of weather during harvest. In some years when rainfall

Production

A study of cotton production trends in Brazil reveals quite a different picture from the study of acreage trends. The difference reflects both the much higher level of yields in the South than in the North, and a pronounced upward trend in yields in the South compared with a downward one in the North.

During the period 1925-29, yields averaged essentially the same in South Brazil as they did in the North, with the result that the South accounted for about the same percentage of total acreage and total production--normally about 14 or 15 percent. Inasmuch as yields rose at the same time that total cotton acreage in South Brazil was expanding, cotton production in the South jumped dramatically, reaching a yearly average of nearly 1.7 million bales during the period 1940-44.

During the 3 succeeding 5-year periods, production in South Brazil averaged well below the 1940-44 average. However, for the last few years, the aggregate expansion of acreage, coupled with sharply higher yields, have combined to push cotton production in South Brazil to essentially the alltime peak and above any of the 5-year averages shown on the accompanying table.

Within South Brazil, the recent expansion of production has been evident in each of the major producing States. Record highs appear to have been established in Paraná, Minas Gerais, and Mato Grosso.

In Northern Brazil, production of cotton, as indicated by 5-year averages, nearly doubled from 1925-29 to 1935-39. During the three succeeding 5-year periods, production in the North dropped off, but pushed to a new record average of 749,000 bales per year during the period 1955-59, and came to well over a million bales in both 1960-61 and 1961-62. The distribution of the northern crop by State and commercial type is as follows:

	Mata Percent	Sertão Percent	Serido Percent
Alagoas	100	---	---
Bahia	100	---	---
Ceará	10	80	10
Maranhão	---	100	---
Paraíba	25	60	15
Pernambuco	35	65	---
Piauí	---	100	---
Rio Grande do Norte	15	10	75
Sergipe	100	---	---

The adding together of the production of the two producing zones to obtain totals for the entire nation reveals a pattern of production quadrupling from 1925-29 to 1940-44 and dropping about one-fourth in 1945-49. After 1945-49, production expanded again, and in 1955-59 approached the earlier record. Production in 1960-61 did establish a new record and indications are that this level was surpassed in 1961-62 by a sizable margin.

continues late into the harvest period, a fairly large share of the crop falls into the lower grades. Brazilian cotton is graded on a number series, 1 through 9, with half grades. All below-grade cotton is inferior to 9. Grade 5 is the base grade and is roughly equivalent to Middling Light Spot or bright Strict Low Middling Light Spot.

In States other than São Paulo, the government's role in variety improvement and seed distribution is less dominating. To a greater or lesser extent the other States draw upon the developmental work in São Paulo and on private seed improvement programs. Thus they make no major pretense of doing fully parallel work.

In the Northeast a program for improvement of Mocó cotton was initiated in the mid-1940's. It has resulted in the development of improved strains that appear under several different names. The lint production of this improved Mocó cotton was reported to the International Cotton Advisory Committee as about 5,000 bales in 1959; 14,000 bales in 1960; and 23,000 in 1961. Although farmers are at liberty to plant any seed available, there is a growing interest in getting them to use the improved seed in all new plantings. Some progress is being made along this line, but several years will be required before any real improvement is noted because Mocó cotton is replanted only about every seventh year.

The improved strains of Mocó were developed in various parts of Northeast Brazil as a part of the improvement program launched in 1946. The strain developed at Fazenda São Miguel is known as "MF-1"; that developed at Cruzeta, as "Cruzeta - 9193"; that developed at Pendencia, as "P-55"; and that at Serra Talhada, as "Improved Serido." The fiber and spinning characteristics of these four strains are reported to be essentially the same and they are far above the average of the typical perennial cotton now in commercial production.

TRADITIONAL PLACE OF COTTON

Brazilian cotton producers as a class have not, in recent generations at least, been as well organized as coffee producers, nor appear to be as proud of being cotton producers as cotton producers in the United States or coffee and livestock producers in Brazil. These factors are believed to be reflected in the sizable annual fluctuations that occur in cotton acreage; but they are not more important, of course, than price and relative income considerations. The fluctuation is more pronounced in South Brazil, where alternatives to cotton growing are more plentiful than in the drier parts of the Northeast.

For the most part, cotton's role throughout past generations has been closely related to coffee, as far as the Southern States of Brazil are concerned. In the past, poor returns from coffee occasioned either by low prices or frost damage prompted farmers to switch rapidly to cotton production for cash income while awaiting a more favorable coffee situation.

Also, when badly eroded coffee lands are no longer fit for further coffee production, farmers have generally reverted, at least in the short run, to cotton production. This is especially true on smaller coffee farms that would be too small to justify a cattle operation.

Agricultural laborers, too, have traditionally preferred to work with coffee for the same reason that the landowners preferred to produce it. The standing of an agricultural worker in his community tends to be related to the number of coffee trees under his control.

Because of the traditional place of cotton in the rural economy of South Brazil, it is not surprising that an estimated 85 percent of the crop is produced by small operators using family labor and perhaps one mule. Generally, the small-scale cotton producers grow about 15 acres of cotton, but on large holdings there may be a number of such cotton farmers.

The typical cotton producer in the small-operator group in South Brazil is a tenant. Land is rented for 3 to 5 years on a cash or sharecrop basis. A typical arrangement in undeveloped areas is for renters to clear the land, farm it for the stipulated period, plant it to coffee, and return the land to the owner afterwards. As a result of this system, there is little or no incentive for good soil management practices, and cotton farming is the same type of exploitive farming as coffee.

This is not to imply that all cotton producers in South Brazil are poor land managers, for a growing number appear to be employing good soil management practices. Some farmers maintain exceptionally good soil fertility. The growing tendency for landlords and labor to recognize achievements in yields per acre is encouraging better soil management, but thus far, this recognition has generally been more evident in coffee than in cotton.

In the cotton areas of the Northeast, the comparatively strong competitive position of cotton as a cash crop causes cotton farming to carry relatively more standing than in South Brazil. Here, although cotton is considered a relatively reliable cash crop, there is a decided tendency to take it "somewhat for granted." For best results, farmers are advised to give cotton the exclusive use of land, but they characteristically interplant cotton fields with such food crops as corn, peas, and even rice.

COMPETITIVE ENTERPRISES

Competition for developed land is intense in the southern cotton area. Cotton not only competes with coffee, the major cash crop, but also with oilseeds, rice, corn, and beans. More than 22 million acres were devoted to these competitive crops recently with cotton averaging an acreage of about 2.5 million. Grassland, too, is strongly competitive. Much of this land is technically suitable for cotton production, but because of the delicate balance of supply to demand of many of the crops except coffee, any shift from present ratios of cotton to other crops is likely to be small. Sugarcane and cotton can scarcely be said to compete, since sugarcane generally enjoys a distinct advantage wherever milling facilities are close at hand.

Coffee acreage is constantly undergoing change since it is planted in newly cleared jungle areas and is replanted on some existing coffee lands. Generally speaking, however, only a small portion of the land taken out of coffee production is usually replanted to coffee. The remaining land is devoted to some other crop or livestock use, or might be entirely abandoned if its continued use seems unprofitable. On land that is still well suited for coffee, cotton or other crops are normally weak competitors. However, cotton tends to be in a comparatively strong competitive position once the decision has been made to retire land from coffee production. This is especially true on heavier red coffee soils. On the lighter soils, peanuts give cotton strong competition.

Coffee and cotton are the major cash crops in South Brazil. There are more than 7.5 million acres of coffee in the general region also producing cotton. Coffee and cotton grow well on the same type soils, and, in fact, are sometimes interplanted.

However, in general practice, coffee has first claim on the best red soils, and more of the cotton is found on the lighter soils. Indications are that when prospects exist for favorable returns from coffee, cotton acreage tends to be depressed, while cotton acreage tends to be expanded when prospects indicate declining returns from coffee. This relationship takes into account both the production and price of each commodity.

Farmers also are influenced by the relative levels of support prices for coffee and cotton. There have been indications in recent years that domestic Brazilian prices for coffee have generally been set at levels that were considered relatively "low" by producers, whereas prices for cotton have been generally favorable. These relationships are frequently cited as partially explaining the recent expansion in cotton acreage in South Brazil.

Although this general price and income relationship for coffee and cotton is believed to exist, it should be noted that statistical studies of the relationships are extremely difficult because of constantly changing support prices, internal taxes, export levies, applicable exchange rates, and other cost-price factors that are influenced by changeable government decisions.

In areas where the supply of labor is fully ample to harvest both coffee and cotton promptly, both crops can be handled satisfactorily despite the fact that peak harvest labor requirements of the two crops tend to coincide. Where labor is less abundant, however, other crops with different labor patterns may compete with cotton for inclusion in a farming system with coffee. Castorbeans and peanuts are two such crops that are often planted instead of cotton if soils are suitable.

New areas of cotton production in the western part of São Paulo are encountering stiff competition for land from peanuts. Two crops of peanuts a year can be grown on the same land--a wet season crop and a dry season crop. In view of the relatively high prices for vegetable oils in Brazil, resulting from fairly high government support prices for oilseeds, peanuts probably will continue to share acreage with cotton in the newly developing land.

The fairly adequate net returns associated with large livestock enterprises cause grassland to compete with cotton for land. Owners of large livestock enterprises have no need for concentrated periods of labor and this reduces their need for workers who work only seasonally. Thus, there is a tendency for large-scale farmers to allow grass to remain on readily tillable land.

Much of this land has good potential for cotton farming. Cotton encounters little competition from other crops in North Brazil. In recent years sisal has grown in importance as a cash crop, but appears to offer keenest competition only where land holdings are large enough and the owner is desirous of establishing a large-scale sisal plantation.

MARKETING

Most of the cotton produced in Brazil is sold by farmers as seed cotton to the gins. Therefore, the guaranteed-price plan includes a seed cotton price that must be paid by the gin companies.

For some years it was the common practice in South Brazil for farmers to sell their better cotton for a single price per pound with no variation by quality, although there were discounts for very poor quality seed cotton. This resulted in no incentive to separate the higher qualities of seed cotton from one another, and caused the percentage of the crop falling in the higher grades to decline.

In 1961 the previous system of classifying cotton before ginning was reintroduced in South Brazil. Official classers examine the seed cotton as it is received at the gins and producers are again paid on the basis of quality. In making these changes it was hoped that the farmers would pick their cotton more carefully and sack it according to grade. This system under which cotton is classified and sold before ginning assures that those States wishing to do so may exercise full control of planting and seed distribution, thereby enabling a faster transition to improved varieties.

Gin companies are the primary sellers of cotton lint. The government supports prices for lint at the gin level, to aid gin companies, especially small independent companies. However, since practically all of the gins are either owned or affiliated with cotton merchants and/or shippers, the lint price support is relatively meaningless. Furthermore, support prices for both seed cotton and lint generally have been set somewhat below prevailing internal prices especially recently when inflation has been a constant economic problem.

A sample of each bale of cotton ginned in the State of São Paulo is sent from the gin to the Bolsa de Mercadorias in the city of São Paulo for classing. Paraná also has organized an official classing agency. Much of the cotton produced in neighboring States, particularly Paraná, is trucked into São Paulo for ginning. A large share of the southern crop is therefore officially classed but classing statistics are not adjusted for state of growth. There is no such systematic classification in North Brazil.

Ginning facilities in Brazil are generally adequate to process the current cotton output. Warehouse space is available to store more cotton than is now produced. However, the westward movement of cotton in South Brazil has forced some gins to move westward and has caused others to serve rather distant producing areas. Thus, while no general lack of marketing facilities hinders expanded cotton production, there are problems of either moving ginning equipment and warehouses, or transporting seed cotton substantial distances.

Present transportation facilities are a problem in much of the cotton producing area. Many roads become impassable during rainy weather, preventing timely use of fertilizers and insecticides. Further, when rains fall during harvest, farmers or those providing a custom hauling service to farmers are not able to reach gins with their cotton. This delay is the more serious since most farmers do not have adequate storage facilities on the farm to store seed cotton.

Cotton in South Brazil moves to southern mills and the Port of Santos by rail and truck. Cotton in North Brazil is transported by truck to ports and both northern and southern mills. Some northern cotton proceeds from ports to southern mills by coastal vessel, some goes to foreign countries by ocean liner. Principal cotton ports in North Brazil are Fortaleza in the State of Ceará, Cabedelo in Paraíba, Natal in Rio Grande do Norte, and Recife in Pernambuco.

DOMESTIC TEXTILE INDUSTRY AND COTTON CONSUMPTION

Brazil's cotton textile industry dates back well over a century and appears to have reached the million-spindle level around 1910. Currently, the industry has in excess of 3.8 million spindles and over 100,000 looms.

In 1960 the State of São Paulo accounted for 1,545,000 spindles. Presently more than one-third of the nation's spindles are located in São Paulo City. Following were Guanabara and Rio de Janeiro with 935,000, the Northeastern States with 642,000, Minas Gerais with 594,000, Santa Catarina with 105,000, and Rio Grande do Sul with 19,000 spindles. Compared with the distribution about 15 years earlier, it is evident that the biggest absolute increases occurred in São Paulo and Minas Gerais. The Northeastern States and Rio Grande do Sul declined in spindle numbers.

The expansion of the cotton textile industry, aided by a generally high level of protection against cotton textile imports, has enabled Brazil to become self-sufficient in cotton textiles. For more than a decade before the outbreak of World War I, cotton cloth imports into Brazil averaged in excess of 10,000 metric tons per year. The level of imports declined during the wartime and early postwar years, rose again to some 7,000 to 8,000 tons in the late 1920's, and trended downward to less than 100 tons by 1951. Brazil now exports some cotton textiles to neighboring countries.

Inasmuch as Brazil produces various staple lengths of cotton, Brazilian mills are more ably supplied than the textile industries of most other producing countries that prohibit imports of cotton. Most Brazilian mills buy their cotton in the open market, but a few of the small northern mills buy locally produced seed cotton and operate their own gins. Quite generally, the mills in North Brazil utilize only cotton grown in the North. However, mills in South Brazil, where the major part of the industry is located, draw cotton from both producing zones.

There is no doubt about the capacity of the Brazilian industry to supply the home market if past conditions continue. However, the prospects are that conditions will change as a result of association with the Latin American Free Trade Association (LAFTA), of which Brazil is a member.

The United Nations made a comprehensive study of the Brazilian textile industry and issued its preliminary report in early 1962. This study verified the widely held impression that much of the industry's equipment was very old and needed replacement if it was to meet high standards of technical efficiency. The study also mentioned that substantial modifications are needed in the scale of operation and management areas if the industry is to have its fullest opportunity to grow and prosper as a part of LAFTA.

It remains to be seen whether the stockholders and management of existing firms would be willing and able to work out such changes within their firms. Much new investment would be required, of which a sizable proportion would be foreign exchange to import machinery not available locally. Brazil's weak foreign exchange situation makes such imports especially difficult, but even if liberal foreign credits were granted much of the total job would still be left to the local industry.

Per capita consumption of cotton in Brazil exceeds the average for Latin America, but much room still exists for improvement. According to the latest data compiled by the Food and Agriculture Organization (FAO), of the United Nations, total textile availability per capita is about 10.6 pounds, of which cotton accounts for about 8.4 pounds. These levels compare with averages of 9.0 and 7.4 pounds, respectively, during 1950-54.

The combination of a population increase of about 1.5 million per year and the gradual rise in per capita textile consumption provides a basis for optimism about a continuing increase in cotton consumption. The future for the cotton textile industry will be even brighter if conditions in the industry permit Brazil to develop sizable exports of cotton textiles to other LAFTA members.

EXPORTS

The level of Brazil's cotton exports has undergone wide swings in trend, and year-to-year variations also have been sharp. This has been especially apparent during the past decade or two, when domestic consumption has been generally high and production has varied greatly.

The long-term trends for Brazil have been characterized by much more stability in the upward trend in cotton consumption than in the corresponding trends for production and exports. The sustained growth in cotton consumption in the period of declining production after World War II caused exports to drop even more sharply than production. Given the drop in production, this decline in exports was inevitable inasmuch as government policy has been such as to insure adequate supplies of cotton for the domestic textile industry. Such a policy has been implemented by either withholding or granting authority to export cotton in order to insure that domestic needs are covered in the computation of export availabilities.

A peak in shipments, reached immediately following World War II, liquidated excess stocks that had accumulated. The build-up of stocks had resulted (1) from continued high production during the war years, and (2) from the lack of a suitable export outlet in Europe. Depletion of these surplus stocks and declining production led to a sharp reduction in exports in the early 1950's. The Korean conflict caused a sharp increase in prices, and production responded immediately. In 1953-54 exports were the third largest of record. The only two previous seasons in which exports were larger were 1945-46 and 1946-47.

In recent years exports have been relatively small. After reaching a low in 1957-58, exports again climbed, and in 1960-61 totaled 681,000 bales. Should the emphasis placed on expanding production prove successful, and there is little reason not to expect at least some success, exports will continue to expand.

Brazilian cotton is exported to many countries. Through the years, West Germany, Japan, and the United Kingdom have been important outlets, but sizable quantities are now going to Common Market countries, Hong Kong, the USSR, and other Iron Curtain countries.

TABLE 3.--Brazilian exports of cotton by country of destination, averages 1935-39 and 1950-54, annual 1958-61

(Bales of 500 pounds gross)

Country of destination	Year beginning August 1					
	Average		1958	1959	1960	1961[1]
	1935-39	1950-54				
	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales
Australia	0	10	0	1	(2)	(2)
Austria	0	3	0	(2)	(2)	(2)
Belgium & Luxembourg	30	14	8	25	41	51
Canada	4	4	0	0	1	(2)
Chile	0	7	0	2	0	(2)
China, Mainland[3]	82	13	0	4	1	0
Czechoslovakia	0	5	0	0	0	3
Denmark	5	1	0	0	0	0
France	90	70	11	43	84	79
Germany, West	286	106	49	126	120	176
Hong Kong	0	26	18	15	61	77
Hungary	0	3	0	3	12	7
Italy	39	43	7	10	14	23
Japan	242	130	91	91	113	56
Netherlands	33	26	9	26	39	59
Norway	1	1	(2)	(2)	1	1
Poland & Danzig	17	6	0	44	4	0
Portugal	26	11	0	1	0	(2)
Rumania	0	0	0	0	6	4
South Africa, Rep. of	0	1	2	7	8	14
Spain	3	44	0	1	70	25
Sweden	5	13	4	9	5	6
Switzerland	(2)	2	(2)	1	6	6
United Kingdom	241	150	40	3	76	46
United States	7	1	1	3	4	1
Uruguay	0	9	0	(2)	1	1
USSR	0	0	0	0	25	57
Other countries	1	26	2	1	3	19
Total	1,112	725	242	446	695	711

[1] August-June; estimate of August-July total is 850.
[2] Less than 500 bales.
[3] Includes Taiwan (Formosa) prior to January 1, 1953.

Estatistica do Comercio Exterior (Rio de Janeiro); U.S. agricultural attachés and other representatives abroad.

PROSPECTS FOR COTTON DEVELOPMENT

Brazil is moving on a number of fronts to expand foreign exchange earnings from cotton and other export crops. Naturally such developments are geared to increasing the production of cotton, inasmuch as government policy encourages the domestic cotton textile industry, and production for export must come over and above that needed for domestic consumption.

Federal and State governmental control over agriculture has been and will continue to be influential in cotton production. Instances of official manipulation of various cost and price factors for cash crops, particularly coffee, have been numerous over the years and they, too, can be expected to continue.

Government policy normally has been directed toward expanding cotton production (with a notable exception occurring during World War II). Sizable cotton exports provide much-needed foreign exchange and reduce the extreme reliance upon coffee as an earner of foreign exchange that has characterized some periods in the past. However, although official policy has indicated that expanded cotton exports are a national objective, governmental actions, at times, have scarcely been consistent with the avowed objective.

Producing cotton for export has been disrupted by developments in Brazil's overall financial condition. One of the things that disrupt cotton production for export has been official manipulation of Brazil's variable exchange rates. At times farmers have found it more profitable to produce a crop for which the internal price was high because a portion of local requirements had to be imported at a high rate of exchange. This is in contrast to producing an export crop like cotton for which the local price was based on a lower stipulated rate of exchange.

Another form of disruption has been the periodic unwillingness of the government to adjust the exchange rate at the beginning of the harvest season to reflect changes that have occurred in the internal price to producers, the value of cotton on the world market, and the deterioration that has taken place in the value of the Brazilian currency. Under both types of conditions, pressures build up for the government to alter the exchange rate applicable to cotton; and if the case seems sufficiently meritorious and urgent, adjustments are made so that peace with the industry is maintained and commerce continues to move.

It is the practice of the Brazilian Government to prepare estimates several times each year of the quantity of cotton being produced, the needs of the domestic mill industry for cotton before the next crop (north or south) becomes available, the exports and export sales thus far authorized, and the remaining cotton available for export. If the exportable supplies already authorized have been substantially committed, and it is clearly evident that additional cotton can be authorized for export without unduly restricting availabilities to domestic mills, an additional allocation of cotton for export may be made. Each such general allocation is further subdivided so that each exporting firm knows what additional quantity of cotton it may sell for export.

In the Northeastern States, which in many ways are recognized as being Brazil's No. 1 problem area, cotton is regarded as one of the more dependable sources of cash farm income. Consequently, programs are in operation to encourage farmers to plant more cotton, to plant improved varieties of cotton, and to adopt improved cultural practices. Evidence to date suggests that some progress is being made; but it is not rapid. Over the next 5 or 10 years, there may be a continued expansion of cotton acreage in the drier areas of the Northeast and a somewhat general adoption of the improved varieties. However, it is doubtful if cultural practices will be improved fast enough to have much effect on production in the Northeast during the next 5 or 10 years.

It is too early to assess the role that cotton will play in the development of land in the Rio São Francisco Valley. Much of the land in this area appears to be highly productive. However, much time and a huge investment are required in such a development operation. Indications to date show that cotton here can be high yielding, but so are other crops. It is therefore questionable whether cotton will claim a large share of the irrigated land in that area in years to come, but in any event, Upland or Egyptian-type cotton would be relied upon since tree cotton yields are too low for it to claim a place in an intensively irrigated farming system. Present indications are that development of the Rio São Francisco Valley is not likely to be a significant factor in Brazil's cotton production for the next 5 or 10 years.

South Brazil has large areas of problem soils on which farming has never been profitable. Research is now being conducted to determine the reason why these soils are nonproductive. Should a practical way be developed to bring such soils into profitable cultivation, the land use pattern could undergo a major change; but it is impossible to anticipate how cotton might fare as a crop in these particular soil areas. In any event, progress in such areas is unlikely to be rapid.

Although agriculture in the coffee areas has traditionally been exploitive of soil resources, many of the soils are inherently productive and would respond to good soil management practices. Generally speaking, cost studies are not available to show how profitable various improved practices would be and there are many farmers in Brazil who believe that the cost structure would preclude their profitable adoption.

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